US010726746B1

(12) **United States Patent**
Crum

(10) **Patent No.: US 10,726,746 B1**
(45) **Date of Patent: Jul. 28, 2020**

(54) **LABEL WITH DISSOLVABLE LINER AND METHODS OF MAKING AND USING SAME**

(71) Applicant: **WARD KRAFT, INC.**, Fort Scott, KS (US)

(72) Inventor: **Jesse Crum**, Fort Scott, KS (US)

(73) Assignee: **Ward-Kraft, Inc.**, Fort Scott, KS (US)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 126 days.

(21) Appl. No.: **16/144,583**

(22) Filed: **Sep. 27, 2018**

Related U.S. Application Data

(60) Provisional application No. 62/563,942, filed on Sep. 27, 2017.

(51) **Int. Cl.**

G09F 3/10	(2006.01)
G09F 3/02	(2006.01)
B31D 1/02	(2006.01)

(52) **U.S. Cl.**
CPC ***G09F 3/10*** (2013.01); ***B31D 1/021*** (2013.01); ***B31D 1/027*** (2013.01); ***G09F 3/02*** (2013.01); *G09F 2003/0222* (2013.01); *G09F 2003/0248* (2013.01)

(58) **Field of Classification Search**
USPC 156/277
See application file for complete search history.

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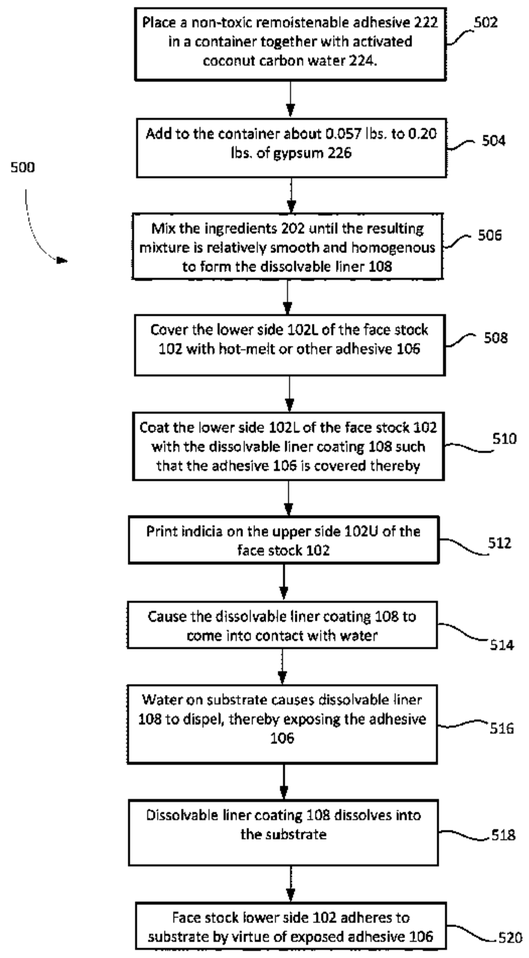
Primary Examiner — Sing P Chan
(74) *Attorney, Agent, or Firm* — Hissan Anis; Anna Quinn; Justin Poplin

(57) **ABSTRACT**

A method of making a label and securing the label to a substrate. The method comprises formulating a dissolvable liner coating. The label has a face stock comprising an upper side and a lower side. The dissolvable liner coating comprises each of a remoistenable adhesive, activated coconut carbon filtered water, and gypsum. The method includes situating an adhesive on the lower side. The method comprises covering the adhesive on the lower side with the dissolvable liner coating. The method includes printing indicia on the upper side while the dissolvable liner coating is covering the adhesive. The method comprises causing the dissolvable liner coating to come into contact with water to cause the dissolvable liner coating to dispel to thereby expose the adhesive. The face stock lower side is secured to the substrate via the exposed adhesive.

19 Claims, 5 Drawing Sheets



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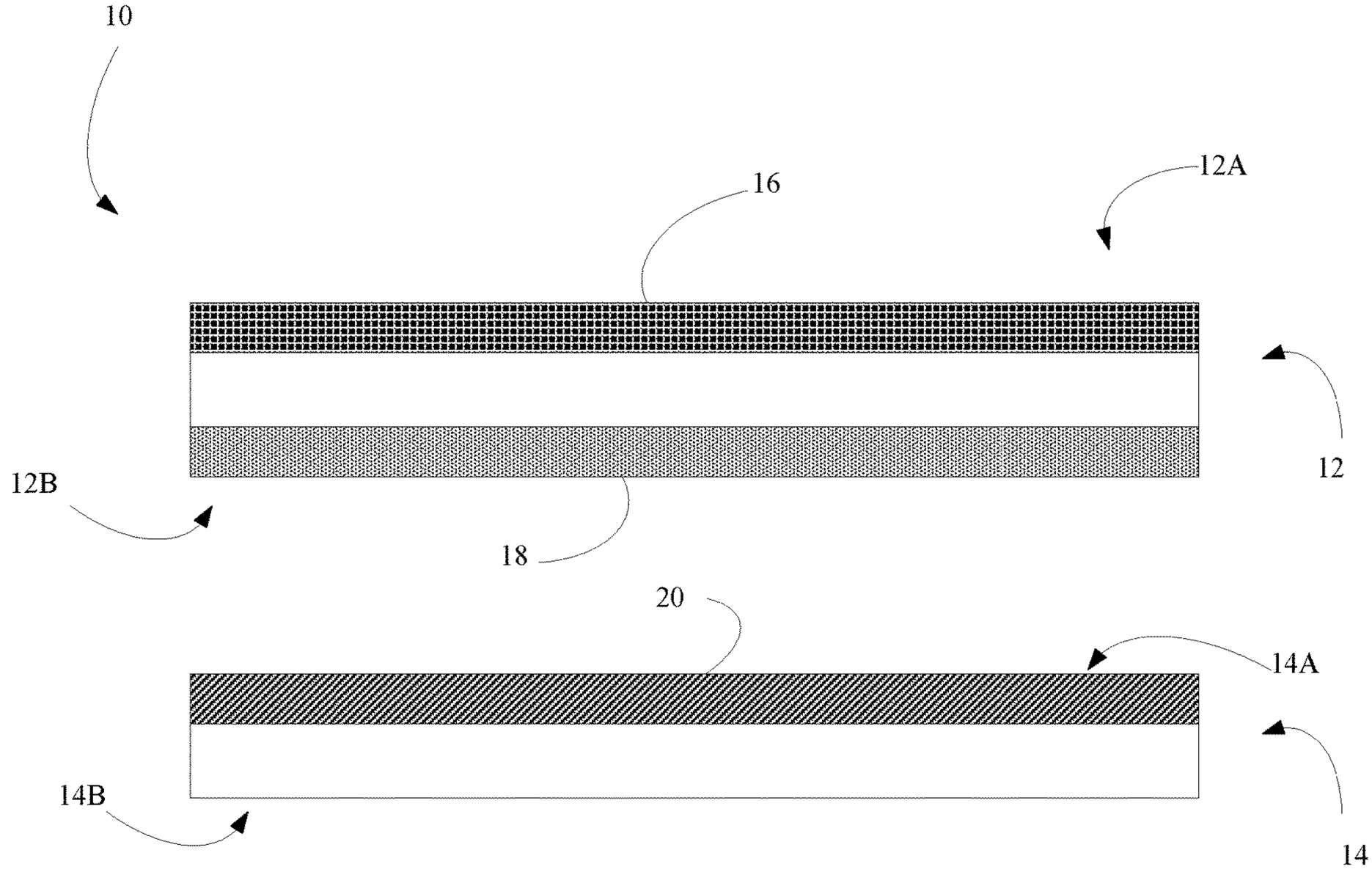

FIG. 1 (PRIOR ART)

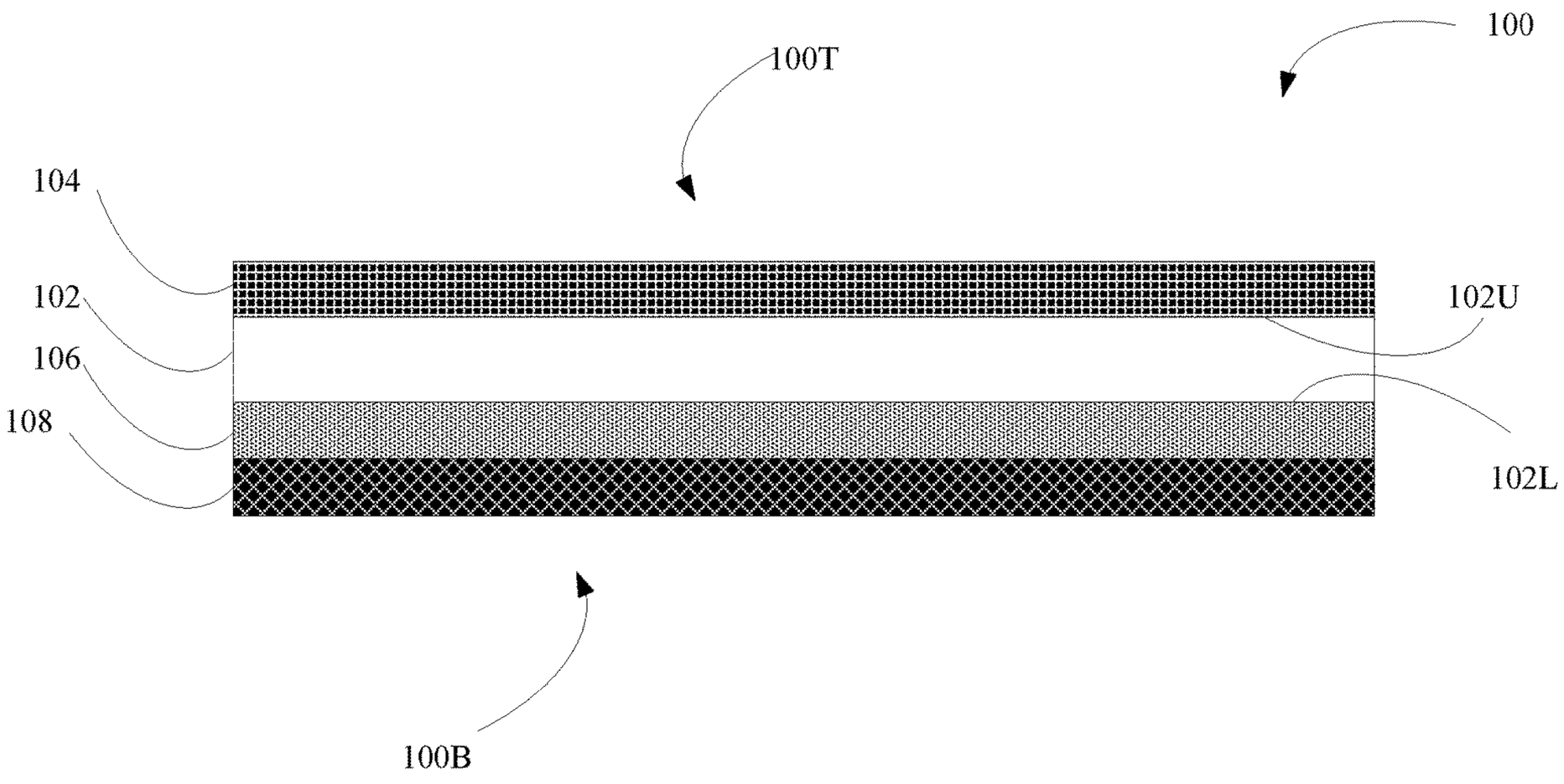

FIG. 2

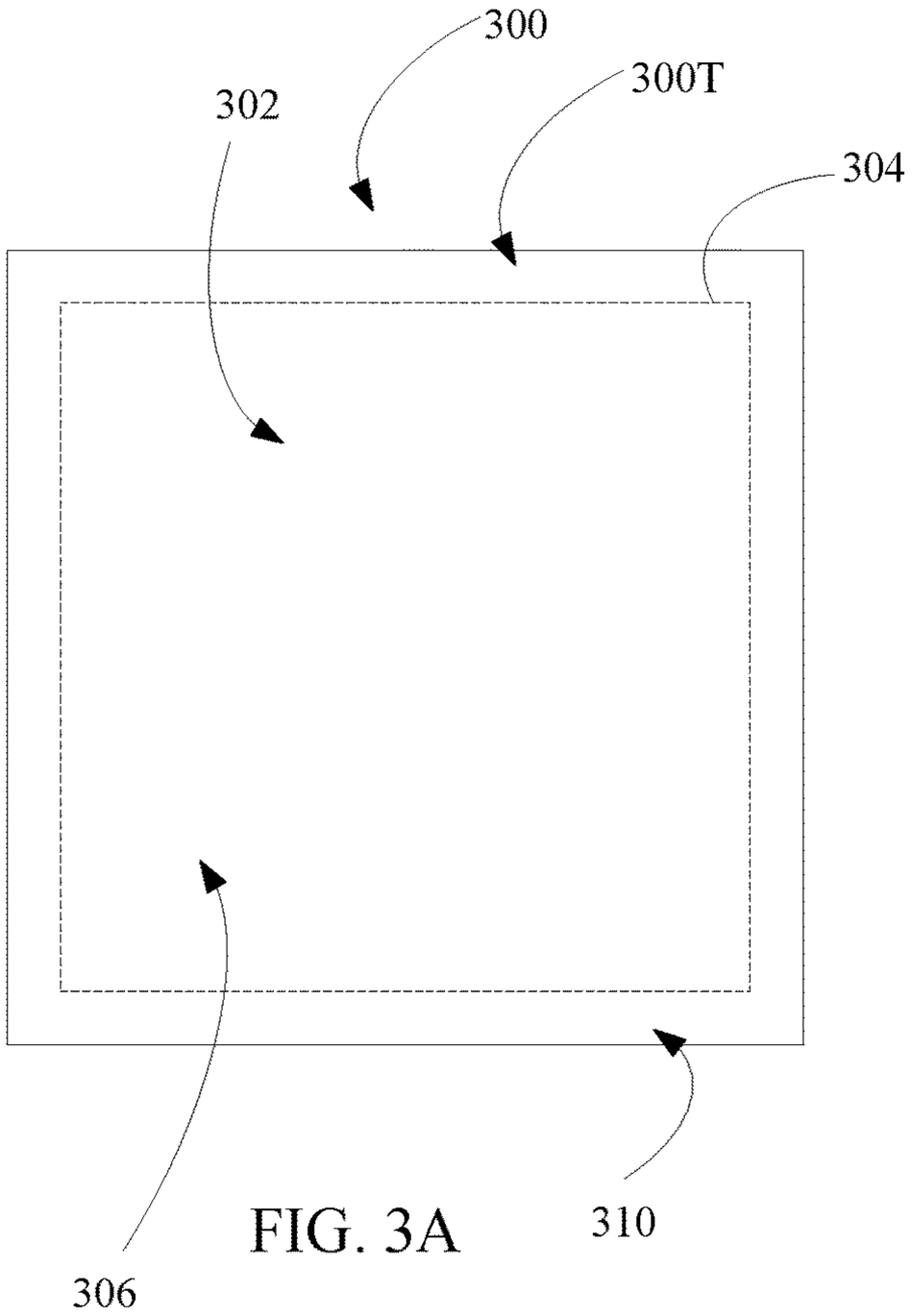

FIG. 3A

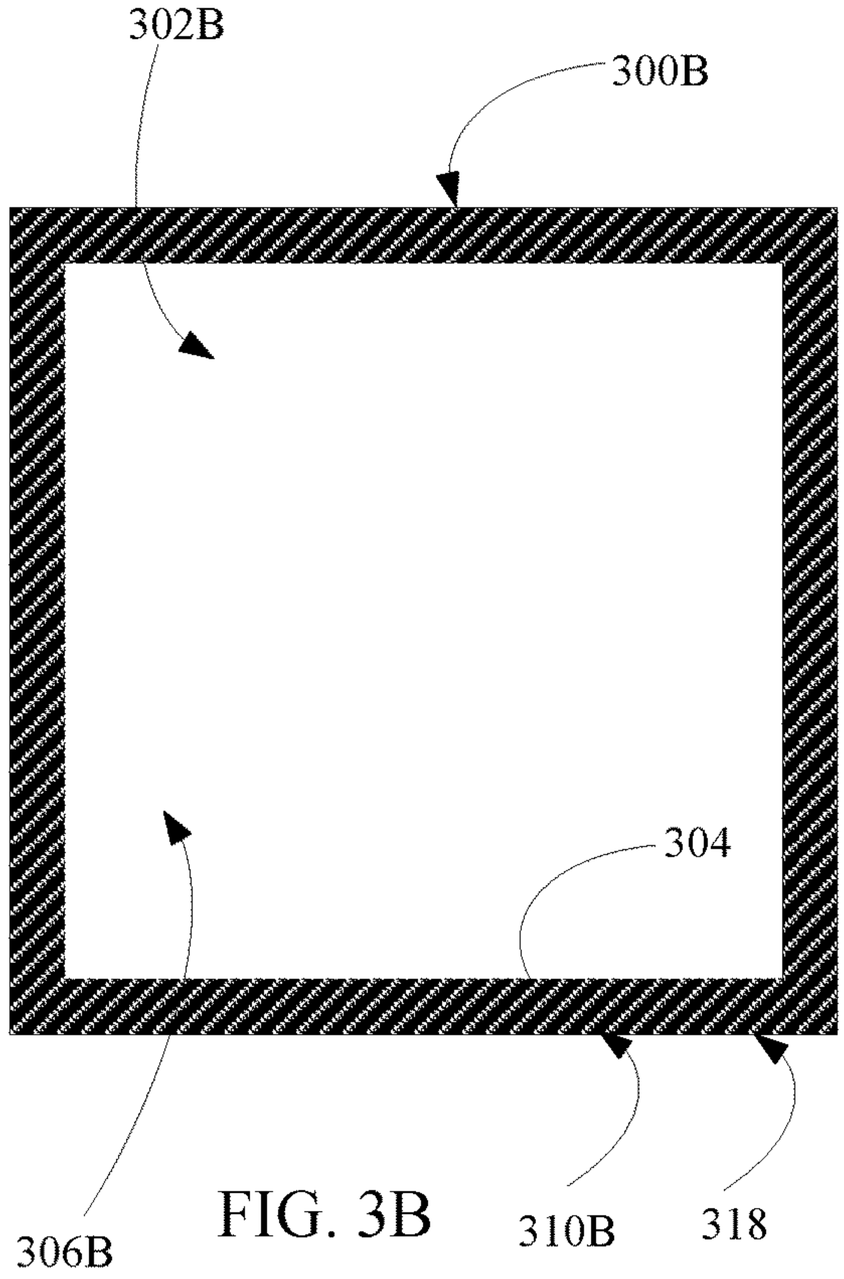

FIG. 3B

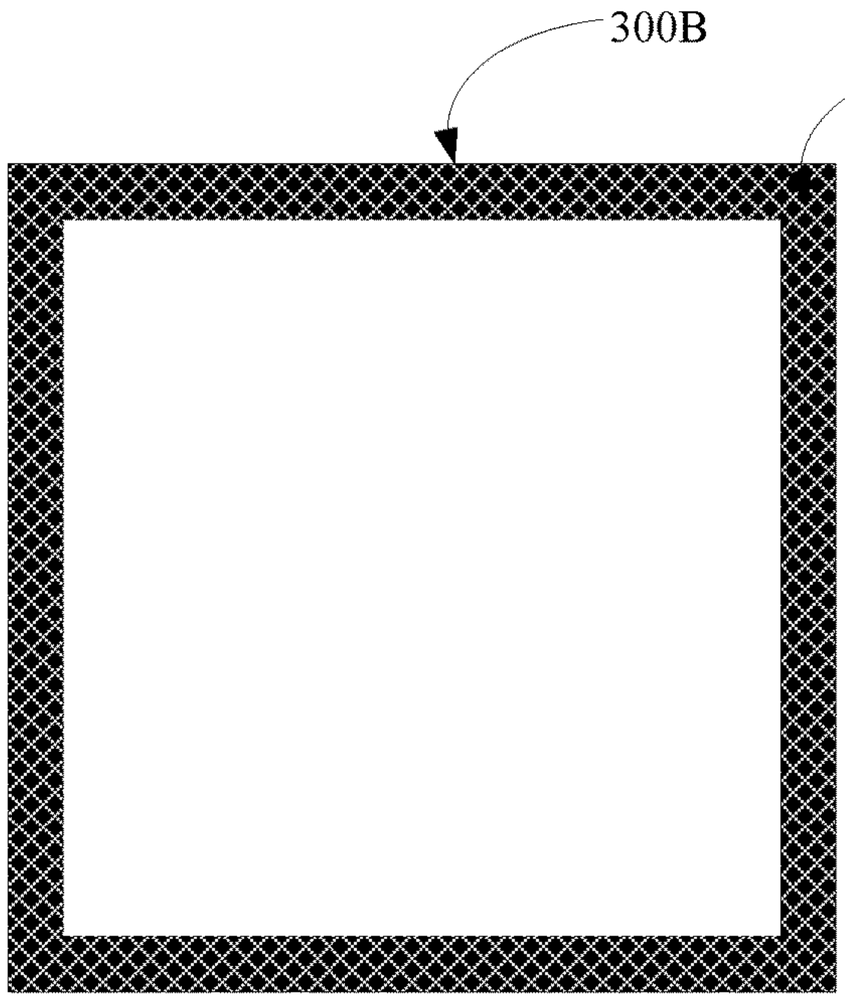

FIG. 3C

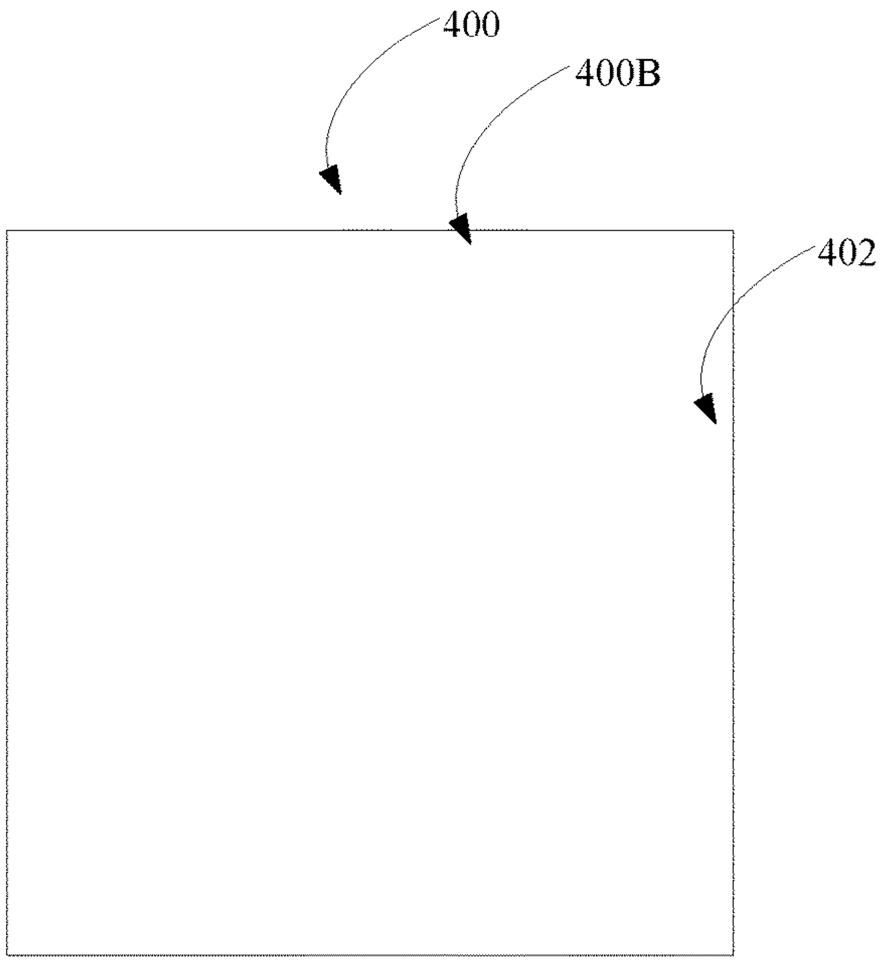

FIG. 4A

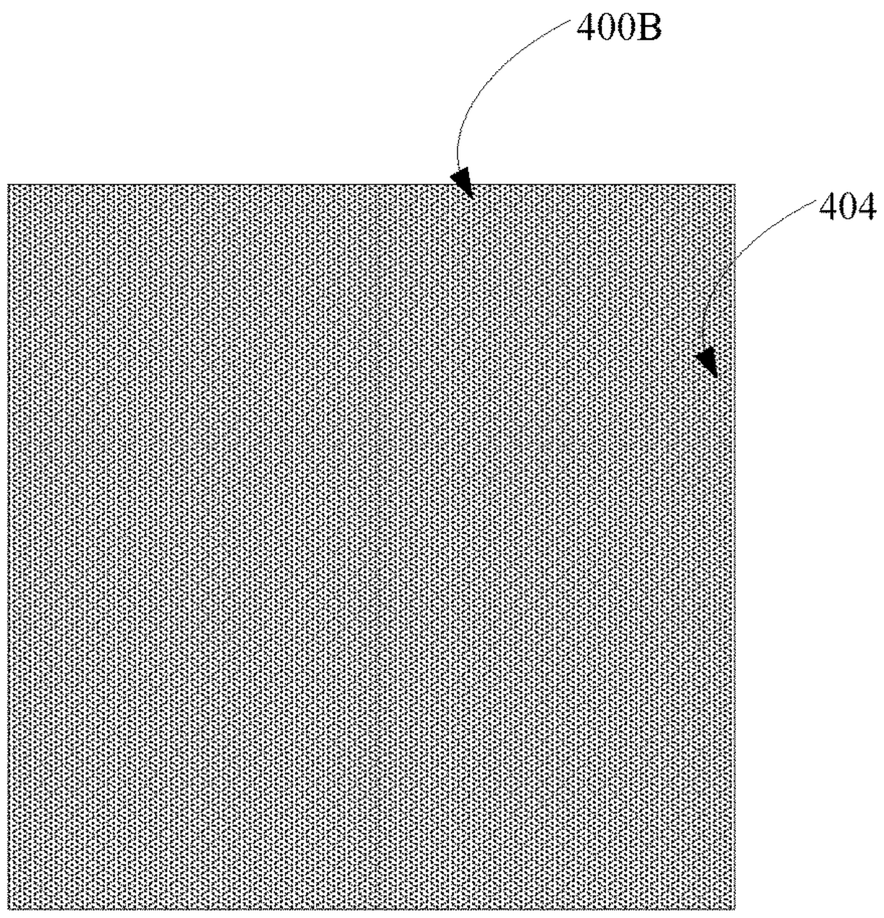

FIG. 4B

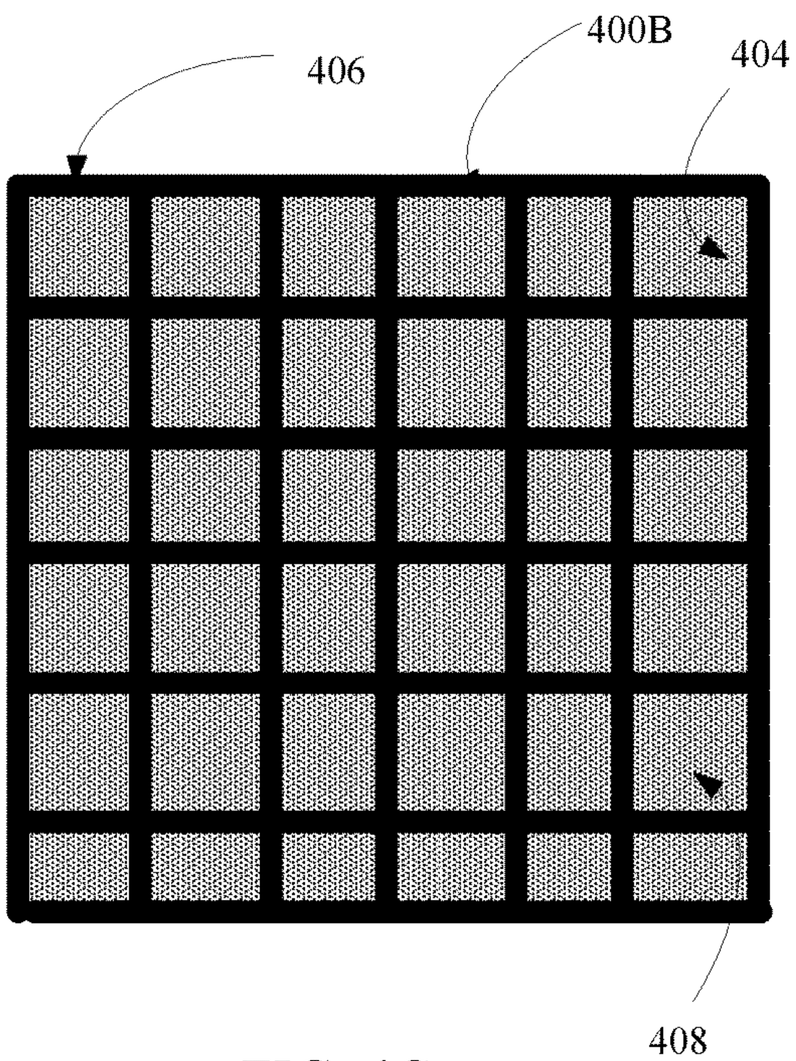

FIG. 4C

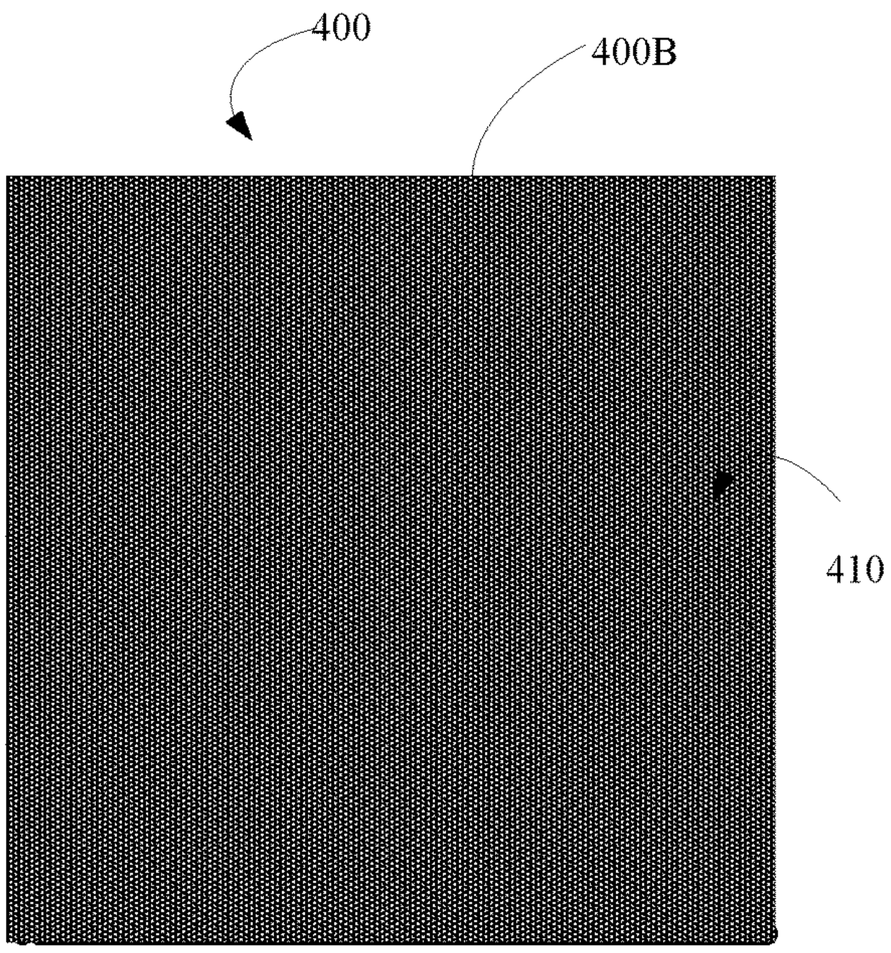

FIG. 4D

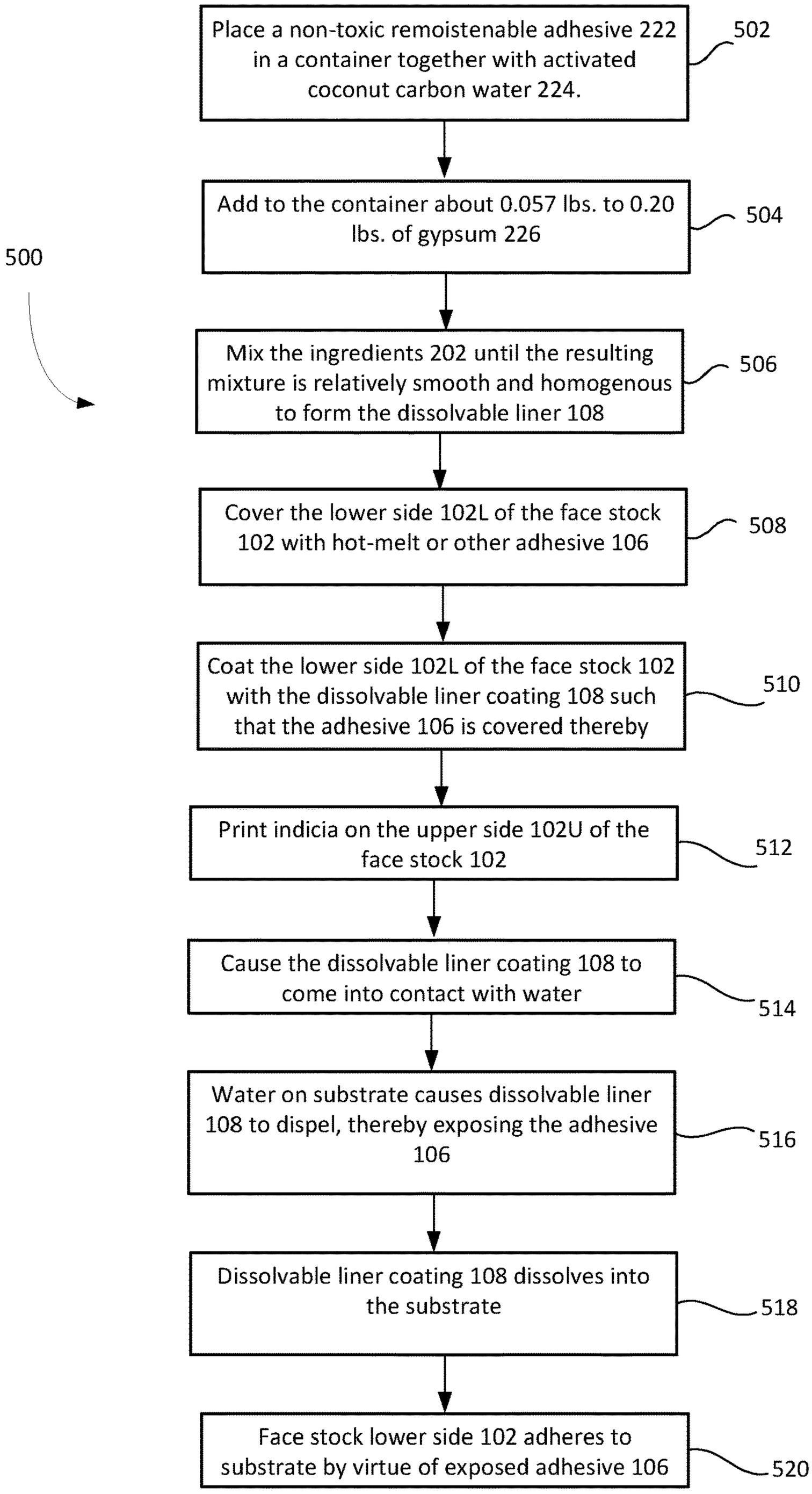
500
Place a non-toxic remoistenable adhesive 222 in a container together with activated coconut carbon water 224.
502
Add to the container about 0.057 lbs. to 0.20 lbs. of gypsum 226
504
Mix the ingredients 202 until the resulting mixture is relatively smooth and homogenous to form the dissolvable liner 108
506
Cover the lower side 102L of the face stock 102 with hot-melt or other adhesive 106
508
Coat the lower side 102L of the face stock 102 with the dissolvable liner coating 108 such that the adhesive 106 is covered thereby
510
Print indicia on the upper side 102U of the face stock 102
512
Cause the dissolvable liner coating 108 to come into contact with water
514
Water on substrate causes dissolvable liner 108 to dispel, thereby exposing the adhesive 106
516
Dissolvable liner coating 108 dissolves into the substrate
518
Face stock lower side 102 adheres to substrate by virtue of exposed adhesive 106
520

Figure 5

LABEL WITH DISSOLVABLE LINER AND METHODS OF MAKING AND USING SAME

CROSS-REFERENCE TO RELATED APPLICATIONS

This application claims priority to U.S. Provisional Patent Application Ser. No. 62/563,942 filed Sep. 27, 2017, and titled "Label with Dissolvable Liner and Methods of Making and Using Same", the disclosure of which is incorporated herein by reference in its entirety.

FIELD OF THE DISCLOSURE

The disclosure relates generally to the field of labels. Specifically, the disclosure relates to labels having nonconventional liners. More specifically, the disclosure relates to a label having a liner configured to dissolve upon application of the label to a moistened section of a substrate, and to methods of making and using such a label.

BACKGROUND

Labels, such as shipping labels, are ubiquitous. Shipping labels are generally configured to resist peeling off the package to which they are adhered, and to resist fading from exposure to heat and light. The labels are also, in general, configured to receive machine readable or other indicia, and in large scale applications, are adapted for use with automated systems.

On average, about twenty-five million packages are processed by just two of the major package couriers in the United States alone each day. Each of these packages has at least one label situated thereon, which outlines, for example, the name and address of the recipient of the package. Each label typically comprises a facestock and a liner, each of which may be made of paper or other such material(s) as discussed herein. The liner is generally disposed upon the application of the label to a package or other substrate.

As each label may have a liner associated therewith, the number of liners that are disposed on a daily basis is exorbitant. The disposal of such a large number of liners represents a significant cost to the label manufacturer, who may have to pass some or all these costs to the consumer. Moreover, the disposable liners add considerably to the waste associated with the labels, and as such, place a strain on the environment. It may be desirable to reduce the costs associated with the liners without adversely affecting the functionality of the label. It may also be desirable to produce labels that are environmentally friendlier relative to the traditional labels having disposable liner plies. The present disclosure is directed generally to labels that may be devoid of traditional liners that have to be disposed. As such, embodiments of the disclosure may allow for the manufacture and use of labels that, as compared to traditional labels, are relatively inexpensive and environmentally friendlier.

SUMMARY

The following presents a simplified summary of the disclosure in order to provide a basic understanding of some aspects of the disclosure. This summary is not an extensive overview of the disclosure. It is not intended to identify critical elements of the disclosure or to delineate the scope of the disclosure. Its sole purpose is to present some concepts of the disclosure in a simplified form as a prelude to the more detailed description that is presented elsewhere.

According to an embodiment, a method of making a label and securing the label to a substrate comprises formulating a dissolvable liner coating. The label has a face stock comprising an upper side and a lower side. The dissolvable liner coating comprises each of a remoistenable adhesive, activated coconut carbon filtered water, and gypsum. The method includes situating an adhesive on the lower side. The method comprises covering the adhesive on the lower side with the dissolvable liner coating. The method includes printing indicia on the upper side while the dissolvable liner coating is covering the adhesive. The method comprises causing the dissolvable liner coating to come into contact with water to cause the dissolvable liner coating to dispel to thereby expose the adhesive. The face stock lower side is secured to the substrate via the exposed adhesive.

According to another embodiment, a method of configuring a label for securement to a substrate comprises formulating a dissolvable liner coating by mixing each of a remoistenable adhesive, activated coconut carbon filtered water, and gypsum. The label has a face stock comprising an upper side and a lower side. The method includes situating a hot-melt adhesive on the lower side and covering the hot-melt adhesive on the lower side with the dissolvable liner coating. The dissolvable liner coating is configured to be dispelled to expose the hot-melt adhesive when the dissolvable liner coating is brought into contact with water.

According to yet another embodiment, a method of configuring a label for securement to a substrate comprises formulating a dissolvable liner coating. The label has a face stock comprising an upper side and a lower side. The dissolvable liner coating comprises remoistenable adhesive and gypsum. The method includes situating an adhesive on the lower side, and covering the adhesive on the lower side with the dissolvable liner coating. The dissolvable liner coating is configured to be dispelled to expose the adhesive when the dissolvable liner coating is brought into contact with water.

BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWINGS

Illustrative embodiments of the present disclosure are described in detail below with reference to the attached drawing figures and wherein:

FIG. **1** is schematic representation of a PRIOR ART label;

FIG. **2** is a schematic representation of a label employing a dissolvable liner, according to an embodiment of the present disclosure;

FIGS. **3**A-**3**C show another embodiment of the label of FIG. **2**;

FIGS. **4**A-**4**D show yet another embodiment of the label of FIG. **2**; and

FIG. **5** is a flow chart illustrating a method of making the dissolvable liner and using a label employing same.

DETAILED DESCRIPTION

A shipping label is adhered to a package and identifies the sender and recipient of the package. Conventional shipping labels have a front face for the printing of indicia and a back face that is adhered to the package. Traditionally, the back face is covered with adhesive, and a liner is removably secured to the back face via this adhesive. Prior to use, the liner is removed, either by hand or otherwise, to expose the adhesive, and the label (specifically, the face ply thereof as discussed herein) is adhered to the package being delivered using the exposed adhesive. As is known, during transpor-

tation or otherwise before the label is adhered to a substrate, the liner covers the adhesive to ensure that the label does not undesirably stick to objects (e.g., other labels, print heads or other components of apparatus used to make and/or print the label) other than the substrate to which is the label is to be adhered.

The label liner is traditionally a single-use, disposable object. Considering that there are many millions of shipping labels in use each day, disposal of these liners of each of these many labels represents significant waste. It may be desirable to reduce this waste to lower the cost and the carbon footprint of labels on the world; particularly when this waste is reduced without adversely affecting the quality or capabilities of the label, or their ease of use.

FIG. **1** shows a conventional label **10**, as is known in the art. The label **10** has a face ply **12** and a liner **14**. The face ply **12** is typically made of paper. The face ply **12** has an upper side **12**A and a lower side **12**B. At least the top side **12**A of the face ply **12** may contain a topcoat **16**. The topcoat **16** is a coating configured for the reception of printed indicia and/or which otherwise improves the appearance or functionality of the face ply **12**. A layer of adhesive **18** is disposed on the lower side **12**B of the face ply **12** to allow the liner **14** to be coupled to the face ply **12**.

The liner **14** is most commonly made of paper or polyester (PET). The prior art liner **14** may also be referred to herein as a liner ply because the prior art liner **14** comprises a ply (or multiple plies) of paper, polyester (e.g., film), etc. The liner ply **14** has a top side **14**A and a bottom side **14**B. The top side **14**A of the liner ply **14** contains a release agent (e.g., silicone) **20**. The liner ply **14** is adhered to the face ply **12** such that the release agent **20** on the top side **14**A of the liner ply **14** is adjacent and in contact with the adhesive **18** disposed on the lower side **12**B of the face ply **12**. The release agent **20** may ensure that the adhesion between the top ply **12** and the bottom ply **14** is releasable; that is, the liner ply **14** may be selectively disassociated from the face ply **12** to expose the adhesive **18** on the lower side **12**B of the face ply.

In use, the liner ply **14** is releasably adhered to the face ply **12**. The label **10** is then passed through the printer to print indicia on the topcoat **16**. During the printing process, the liner ply **14** covers the adhesive **18** and ensures that the adhesive **18** does not interact with the printer. Once the printing is complete, the liner ply **14** is disassociated from the face ply **12** to expose the adhesive **18**. The face ply **12** is then adhered to a substrate (e.g., a package, a box, an envelope, or other object or surface to which the label is adhered) via the adhesive **18** and the liner ply **14** is disposed in a trash can or elsewhere.

As noted, disposable liner plies represent significant waste and cost. The prior art indicates that efforts have been made to configure a label without a disposable liner. U.S. Pat. No. 8,109,537 illustrates one example of a label devoid of a disposable liner. The '537 Patent label includes a single ply which comprises adhesive on one side and a release material on the other. This "linerless" configuration allows for multiple labels to be removably overlaid to one another, e.g., on a roll. Specifically, the release material of the underlying label ensures that this label does not permanently adhere to the overlaid label because of the adhesive thereof.

As the '537 Patent's linerless labels are devoid of a conventional liner, they address at least some of the deficiencies associated with conventional liners. However, the '537 Patent's (and other such) linerless labels present other issues that must be addressed. Because a liner is absent from the label, the adhesive on the labels is exposed to the printer during the printing process, and may cause the label to undesirably stick to the printer roller necessitating expensive repairs. To alleviate this concern, the linerless labels are typically printed with specialty printers having coated rollers (e.g., direct thermal printers having rollers comprising silicone embedded rubber) specifically adapted to ensure that the labels do not adhere thereto. Much if not all of the cost savings associated with the liner are lost in purchasing and configuring the specialty printing equipment, which is undesirable. Further, the artisan understands that because of the configuration of such linerless labels, these labels cannot be printed using laser printers, thermal transfer printers, or any printer other than direct thermal printers.

It may be advantageous to have a label that does not suffer from the disadvantages associated with conventional liners. It may further be desirable to have a label that does not suffer from the drawbacks of linerless labels, and which, like traditional labels having liners, can be printed via any off-the-shelf printer. The present disclosure may provide for such a label.

Focus is directed now to FIG. **2**, which shows one example embodiment **100** of a label having a dissolvable liner, according to the teachings of the present disclosure. The illustrated label **100** has a top side **100**T and a bottom side **100**B. As discussed herein, indicia may be printed on the top side **100**T and the label **100** may be adhered to a substrate at the bottom side **100**B.

In more detail, the label **100** may have a face stock **102**, which may have an upper side **102**U and a lower side **102**L. The face stock **102** may comprise a solitary ply **102**, made e.g., of paper. This face stock **102** may also be referred to herein as a face ply to indicate that the face ply comprises a solitary ply. Alternately, in other embodiments, the face stock **102** may contain more than one ply. In other embodiments still, the face stock **102** may comprise a film (e.g., a clear film) or other printable substrate.

The face ply **102**, at its upper side **102**U, may be provided with a topcoat **104**. The topcoat **104**, akin to the topcoat **16** of the prior art label **10**, may be configured for the reception of printed (e.g., black and/or colored) indicia (e.g., content configured to be consumed by consumers). The lower side **102**L of the face ply **102** may contain a layer of adhesive **106**. The adhesive **106** may be a hot-melt adhesive, an acrylic adhesive, a combination thereof, and/or any other adhesive now known or subsequently developed.

As discussed above, in linerless labels, the adhesive (e.g., the adhesive **106**) at the bottom sides of the labels is uncovered, and the top sides of the labels contain silicone which precludes one label from undesirably sticking to another label in contact therewith (e.g., when the linerless labels are stacked together). While such a configuration precludes undesirable attachment between one label to another (e.g., precludes securement of stacked linerless labels), the exposed adhesive of the linerless labels may nevertheless cause the linerless labels to undesirably adhere to other objects with which the linerless labels come into contact with. In the dissolvable liner label **100**, conversely, the layer of adhesive **106** is temporarily and selectively covered to preclude the adhesive **106** from causing the label **100**, e.g., the face stock **102** thereof, to unintentionally adhere to any object that comes into contact with the label **100**. When the user desires to adhere the face stock **102** to a substrate, the user may then cause the adhesive **106** to become exposed so that the face ply **102** may be secured to a substrate. As discussed herein, unlike labels having traditional liner plies, the user may cause the adhesive **106** of the

label **100** to be exposed without the need to discard any liner in a waste basket or elsewhere.

In an embodiment, the bottom side **100**B of the label **100** may include a dissolvable liner **108** that is in contact with the adhesive **106**. The dissolvable liner **108** may be outwardly adjacent the adhesive **106** such that a distance between the adhesive layer **106** and the face ply upper side **102**U may be less than a distance between the dissolvable liner **108** and the face ply upper side **102**U. The dissolvable liner **108** may temporarily cover the adhesive **106** until the label **100** is to be adhered to a substrate. The phrase "dissolvable liner", as used herein, refers to a cover for covering a first composition, which cover is specifically adapted to dissolve or otherwise dispel when the cover is brought into contact with a second composition to thereby expose the first composition. In embodiments, the first composition may be the adhesive **106** and the second composition may be water (e.g., water vapor, liquid water, etc.). That is, in embodiments, the dissolvable liner **108** may be a composition that: (a) covers the adhesive **106** so as to preclude the face ply lower side **102**L on which the adhesive **106** is situated from sticking to another object or surface; and (b) is configured to dissolve and/or dispel when the dissolvable liner **108** is brought into contact with water to expose the adhesive **106** so that the face ply lower side **102**L may be adhered to the desired substrate via the adhesive **106**. The term "dissolvable liner", as used herein, specifically excludes a traditional liner ply or plies, e.g., paper coated at least in part with silicone or other release material, a film, etc. The term "dissolve", as used herein, connotes that the dissolvable liner coating, once wetted, is dispelled and absorbed by the substrate. In embodiments, the dissolvable liner **108** may not have any (or any appreciable) adhesion. For example, while the dissolvable liner **108** is covering the adhesive **106** and before the dissolvable liner **108** is brought into contact with water, the dissolvable liner **108** may not undesirably cause the face ply **102** to stick to objects that come in contact with the face ply lower side **102**L.

In an embodiment, the dissolvable liner **108** may comprise a non-toxic remoistenable adhesive **222**, activated coconut carbon filtered water **224**, and powdered gypsum **226**. The activated coconut carbon filtered water **224**—which, as is known, may be devoid of many of the impurities found in tap water—may desirably affect the viscosity of the remoistenable adhesive **222** for the instant application. Further, it is believed that the activated coconut carbon filtered water **224** may allow the final dissolvable liner **108** composition to disintegrate and dissolve readily upon the application of tap water (as discussed below). The powdered gypsum **226** may serve, among other things, to increase the stability and the temperature resistance of the remoistenable adhesive **222**. The gypsum **226** may also serve as a blocking agent, e.g., preclude the remoistenable adhesive **222** from being undesirably activated in humid ambient conditions. In embodiments, the liner **108** may include different (e.g., additional) ingredients. For example, where it is desired to give the dissolvable liner **108** a hue (e.g., an off-white (or any other) hue such that the dissolvable liner **108** resembles the traditional paper liners), a colored pigment may be included to impart such a hue to the liner **108**.

Table 1 below shows the constituents of the dissolvable liner (also referred to herein as a "dissolvable liner coating") **108**, according to one illustrative embodiment of the present disclosure, with which the label **100** (specifically the bottom side **100**B thereof) may be coated to preclude the adhesive **106** from undesirably coming into contact with objects until after the label **100** has been printed and is ready to be adhered to a substrate. The dissolvable liner **108** may temporarily cover the adhesive **106** while the top coat **104** is exposed for printing. Because the adhesive **106** is covered during the printing process, the label **100** may be printed using any technology now known or subsequently developed that is usable to print the prior art label **10** (such as a direct thermal printer, a thermal transfer printer, a laser printer, an inkjet printer, etc.). The dissolvable liner **108** may prevent the adhesive **106** from coming into contact with any object (e.g., a printer roller, another label, a table or other surface) before it is time to adhere the label **100** to the substrate. The dissolvable liner **108** may be heat-resistant and may be able to readily withstand the relatively high temperatures encountered by labels in printers. Further, the dissolvable liner **108**—which may comprise a non-toxic remoistenable adhesive as a constituent thereof as discussed herein—may as a whole be a non-sticky substance when dry. Thus, when the dissolvable liner **108** is applied to the lower side **102**L of the face ply **102**, it may cover the adhesive **106** (e.g., the hot melt adhesive **106**) without itself causing the face ply lower side **102**L to undesirably stick to surfaces with which the lower side **102**L comes into contact.

TABLE 1

DISSOLVABLE LINER 108

No.	Ingredient 202	Quantity range 204	Preferred quantity 206
1	Non-toxic remoistenable adhesive 222	2 lbs. to 6 lbs.	4 lbs.
2	ACC water 224	0.125 lbs. to 0.375 lbs.	.25 lbs.
3	Gypsum 226	1-50 heaping teaspoons (about 0.05 lbs. to 2.8 lbs.)	21 heaping teaspoons (about 1.2 lbs)

The quantity ranges **204** and the preferred quantities **206** of the various ingredients **202** listed above are merely exemplary and are not intended to be independently limiting. For example, in embodiments, more activated coconut carbon filtered water **224** ("ACC water") may be added to reduce the viscosity of the dissolvable liner coating **108**, more gypsum **226** may be added to further enhance the stability of the adhesive **222**, etc. Further, in embodiments, the preferred quantities **206** of the various ingredients **202** listed above may be proportionally reduced or increased for smaller or larger applications, respectively. The preferred quantities **206** listed above will yield a volume of about 5.45 lbs. of the dissolvable liner coating **108**, which may be used to coat many thousands of labels **100** to cover the adhesive layers **106** thereof.

In an embodiment, the remoistenable adhesive **222** may have a vapor pressure at 20° C. of about 23.4 hPa, a density at 20° C. of about 1.08 g/cm^3, a pH value at 20° C. of 4.0-6.0, a flash point of over 232° C., and a VOC content of 1.6 g/l/0.01 lb/gl. For example, in an embodiment, the remoistenable adhesive **222** may be the PriscoBond 121-H remoistenable adhesive commercially available by Prisco®. Alternately or additionally, in other embodiments, the remoistenable adhesive may be one or more of the remoistenable adhesives disclosed in U.S. Pat. No. 3,574,153 to Sirota, U.S. Pat. No. 4,575,525 to Wancome et al., U.S. Pat. No. 4,623,688 to Flanagan, U.S. Pat. No. 5,296,535 to Fazioli et al., each of which are incorporated by reference herein as if fully set forth herein. Other remoistenable adhesives known to the artisan and/or subsequently developed may likewise be employed. The artisan will appreciate from the disclosure herein that the invention is not directed

solely to the non-toxic remoistenable adhesive **222**—which may in embodiments be commercially available—but generally to the dissolvable liner composition that contains the remoistenable adhesive **222** as a constituent thereof and the use of this dissolvable liner composition to temporarily and selectively cover the adhesive **106** until the face ply **102** is to be adhered to a substrate. Applicant's experimentation confirms that off-the-shelf remoistenable adhesives **222** disclosed herein, such as the PriscoBond 121-H product, cannot be used as adhesive covers for labels until the other ingredients **202** (i.e., the ACC water **224** and Gypsum **226**) are added thereto.

FIG. **5** is a flow chart illustrating a method of making and using the dissolvable liner **108**, in an embodiment. At step **502**, a non-toxic remoistenable adhesive **222** may be placed in a container together with activated coconut carbon filtered water **224**. For example, 4 lbs. of PB121-H-Prisco® may be weighed and placed in a container together with 0.25 lbs. of activated coconut carbon filtered water. Thereafter, at step **504**, about 1.2 lbs. (i.e., about 21 heaping teaspoons) of gypsum **226** may be placed in the container. At step **506**, the ingredients **202** may be mixed together. For example, in an embodiment, a cutting blade spinning at about 2,000 rpm may be used to mix all the ingredients **202** until the resulting mixture **108** becomes relatively smooth and homogenous. At step **508**, a label face stock **102** with the lower side **102**L thereof covered with adhesive **106** (e.g., a hot-melt or other suitable adhesive) may be provided. At step **510**, the adhesive **106** may then be coated with the dissolvable liner **108** (i.e., the dissolvable liner coating **108** may be applied to the lower side **102**L such that the adhesive **106** is between the lower side **102**L and the dissolvable liner coating **108**; the dissolvable liner coating **108** may dry in a matter of minutes or seconds, and when dried, may serve to cover the adhesive **106** and preclude same from unintentionally coming into contact with an object).

At step **512**, indicia may be printed on the upper side **102**U of the face stock **102** (e.g., on the top coat **104** thereof). The label **100** may now be printed using any printer (including any conventional printer, such as a direct thermal printer, a thermal transfer printer, a laser printer, etc.). Specifically, as the label **100** is passed through the printer, the topcoat **104** thereof may receive printed indicia whereas the dissolvable liner **108** may cover the adhesive **106** and preclude direct contact between the adhesive **106** and the printer parts.

The dissolvable liner **108** may be configured to dispel (or otherwise disintegrate) when the liner coating **108** comes into contact with water (e.g., water vapor, liquid water, sprayer containing tap water, etc.) and/or, in embodiments, one or more other liquids. As such, when the face ply **102** is ready to be adhered to a substrate, the dissolvable liner coating **108** may be brought into contact with water at step **514** to cause the dissolvable liner coating **108** to dispel to expose the underlying adhesive **106**. The terms "water" and "moisture" may be used interchangeably herein.

Moisture may be introduced to the face ply **102** directly and/or indirectly. In an embodiment, the substrate (e.g., the box, package, envelope, etc.) and/or a section thereof may be moistened with water and the label bottom side **100**B may be placed on the moistened section of the substrate so as to allow the dissolvable liner coating **108** to interact with the moisture on the substrate (indirect moistening) and dissolve into the substrate. In another embodiment, instead of moistening the substrate and then placing the face ply **102** on the moistened substrate, the face ply **102** (i.e., the dissolvable liner coating **108** thereof) itself may be moistened to cause the dissolvable liner coating **108** to dispel (direct moistening) and then the face ply **102** may be situated on the substrate where the dissolvable liner coating **108** may be adsorbed thereby. Applicant's experimentation has shown that if the moisture is applied directly to the dissolvable liner coating **108** on the face stock **102**, the face stock **102** may then be adhered to the substrate any time within the next 30-120 seconds or so (after which time the dissolvable liner coating **108** may re-dry and may have to be rewetted to use the label **100**). Alternately, if the substrate is moistened instead of directly moistening the dissolvable liner coating **108**, then the face ply **102** may have to be placed on the moistened section of the substrate within 3-20 seconds or so (as the moisture may thereafter be absorbed by the substrate and may not be able to serve to dissolve the dissolvable liner coating **108**). In some embodiments, moisture may be introduced to the dissolvable liner coating **108** both directly and indirectly (i.e., the substrate may be moistened and the dissolvable liner coating **108** may also be moistened before the face ply **102** contacts the moistened substrate).

In embodiments, water may be added to the substrate and/or the face ply **102** via a sprayer. Use of a sprayer may allow for a small volume of water to be disposed on the substrate and/or the face ply **102** and may reduce the risk that the amount of water disposed on the substrate will cause any damage thereto. In other embodiments, water may be added to the substrate and/or the face ply **102** via other means (e.g., via different water dispensing mechanism, via a moistened cloth or wipe, etc.).

At step **516**, the moisture introduced to the dissolvable liner coating **108** (e.g., directly and/or indirectly) may cause the dissolvable liner coating to dispel and expose the adhesive **106**. At step **518**, if the moisture was introduced to the face ply **102** directly (e.g., if water was sprayed or otherwise placed directly onto the face ply **102**), the face ply **102** may now be situated on the substrate, and the substrate may absorb the dissolvable liner coating **108** leaving the exposed adhesive. Conversely, if the moisture was introduced to the face ply **102** indirectly (e.g., a section of the substrate was moistened and the face ply **102** was placed on the moistened section of the substrate), the moisture on the substrate may cause the dissolvable liner coating **108** to dispel and the coating **108** may be absorbed by the substrate.

At step **520**, the label **100** may now adhere to the substrate by virtue of the exposed adhesive **106**. In this way, by using water to cause the dissolvable liner **108** to dissolve into the substrate, the adhesive **106** may be covered until the label **100** is to be applied to the substrate and the requirement for a traditional liner ply may be negated. The amount of water (e.g., the water sprayed onto the substrate) used to dissolve the liner **108** may be negligible and may not cause any appreciable damage to the substrate. Once the dissolvable liner coating **108** is wetted (directly or indirectly) and the face ply **102** is situated on the substrate, the dissolvable liner **108** may dissolve relatively quickly such that the label **100** can generally simultaneously be adhered to the substrate via the adhesive **106**. That is, dissolving of the dissolvable liner coating **108** into the substrate in step **518** and adherence of the face ply **102** to the substrate in step **520** may occur generally simultaneously.

Thus, as has been described, the dissolvable liner **108** may, in effect, replace the traditional liner plies of prior art labels, and the label **100** may be used in any application where prior art labels were heretofore employed.

The illustrated label **100**, as discussed herein, may be configured for single-sided printing. Such, however, is merely exemplary, and the dissolvable liner concept dis-

closed herein may likewise be used with labels that are printable on both sides. Focus is directed to FIGS. **3**A-**3**C to illustrate a label **300** employing the dissolvable liner **108** that is printable on both sides.

The label **300** may have a top side **300**T (FIG. **3**A) and a back side **300**B (FIG. **3**B). The top side **300**T may include a topcoat **302** comprising printable coating. The topcoat **302** may allow the top side **300**T to receive monochrome or color printing via any printing means now known or subsequently developed.

The label **300** may, in an embodiment, include a perforation (or a line of weakness) **304**. The perforation **304** may demarcate a central portion **306** circumscribed by a border portion **310**. In embodiments, the central portion **306** may be separable form the border portion **310** along the perforation **304**. On the top side **300**T, in embodiments, each of the central portion **306** and the border portion **310** may comprise the printable coating **302**. In other embodiments, the border portion **310** may be devoid of the printable coating **302**.

FIG. **3**B shows the back side **300**B of the label **100**. The backside **306**B of the central portion **306** may also include a printable coating **302**B, which may allow the backside **306**B of the central portion **306** to be printed in any printer. The border portion **310**, at the back side **310**B, may include adhesive **318**. As shown in FIG. **3**C, this adhesive **318** may be coated by the dissolvable liner coating **308** (coating **308** and coating **108** discussed above may be made in the same way). The coating **308** may temporarily cover the adhesive **318** and preclude the adhesive **318** from unintentionally coming into contact with an object (e.g., a printer roller) until the label **300** is ready to be applied to a substrate. The label **300** may thus be printed on both sides (e.g., in a double sided printer or otherwise). When it is time to adhere the label **300** to a substrate (e.g., a package), the substrate may be moistened (e.g., a small quantity of water may be sprayed on the portion of the substrate to which the label **300** is to be applied). The label **300** may then be brought into contact with the substrate such that the back side **300**B, and specifically the dissolvable liner **308** coating disposed thereon, contacts the moistened substrate. The moisture may cause the dissolvable liner **308** to dissolve into the substrate, thereby exposing the adhesive **318**. The adhesive **318**, now exposed, may cause the label back side **300**B to adhere to the substrate. When the recipient receives the package, he may disassociate the central portion **306** from the border portion **310** via the perforations **304**, and access the indicia printed on the back side **300**B of the label **300**. In this way, thus, the dissolvable liner concept disclosed herein may be used to do away with wasteful and relatively expensive conventional liners of both single-sided and double-sided labels.

In the embodiments discussed above, the dissolvable liner (e.g., the liner **108** and/or **308**) is displaced by the water and is absorbed by the substrate to which the label is to be adhered. In some applications, however, the substrate may be unable to dissolve water (or other liquids). For example, where the substrate is glass, a plastic film, etc., it may be unable to dissolve the dissolvable liner displaced from the label by the moistening of the substrate. In these embodiments, the displaced dissolvable liner may be caused to be dissolved by the label itself, e.g., by a hydrophilic coating disposed thereon. FIGS. **4**A-**4**D illustrate these concepts in additional detail.

Specifically, FIGS. **4**A-**4**D show another embodiment **400** of a label comprising a dissolvable liner. In more detail, FIGS. **4**A-**4**D show one example method of making the label **400**. The label **400** depicted in FIG. **4**D is ready to be used, and is depicted in its initial stages in FIGS. **4**A, **4**B, and **4**C for illustrative purposes.

FIG. **4**A shows a back side **400**B of the label **400**. The label **400** may comprise, e.g., printable film or other suitable materials. In an embodiment, the label **400** may comprise a solitary ply **402**. The ply **402**, on its front side (not expressly shown in FIG. **4**A), may comprise printable coating to receive printed indicia, as discussed above for other embodiments.

As shown in FIG. **4**B, the back side **400**B may first be coated with a coating **404**. The coating **404** may be a hydrophilic coating (i.e., a coating configured to absorb water). In an embodiment, the coating **404** may be, e.g., an inkjet coating. In another embodiment, soft feel coating or other such coating may be employed. In some embodiments, the coating **404** may be a combination of two or more hydrophilic coatings; alternately, the coating **404** may be a combination of substances that, when mixed together, have a tendency to absorb water. The artisan understands that many such coatings are commercially available today.

Next, as shown in FIG. **4**C, a pattern of adhesive **406** (such as a hot-melt adhesive or other conventional adhesive) may be disposed on the hydrophilic coating **404**. The pattern **406** may be any pattern (e.g., a checkerboard pattern, a dot pattern, etc.), and may but need not be symmetrical. The pattern **406** may include openings **408**, i.e., areas that are devoid of the adhesive.

Then, as shown in FIG. **4**D, the dissolvable liner coating **410** (which may be generally identical to the dissolvable liners **108** and **308** discussed above) may be applied to the label back side **400**B such that the dissolvable liner **410** covers the adhesive pattern **406**. The dissolvable liner **410**, unlike the adhesive pattern **406**, need not be applied in a pattern. The label **400** (e.g., the front side thereof) may then be printed, e.g., in a direct thermal, thermal transfer, laser, or other printer, and the dissolvable liner **410** may cover the adhesive pattern **406** during the printing process to ensure that the label **400** does not undesirably stick to the printer components. The printed label **400** may now be ready for use with any substrate, including substrates that are unable to absorb water and/or substrates that absorb water very slowly.

Assume, for example, that the label **400** is to be applied to a glass substrate (or to a plastic film or other such substrate). The glass may be moistened (e.g., water may be sprayed thereon) and the label back side **400**B may be brought adjacent the glass such that the dissolvable liner **410** contacts the moistened glass surface. The moisture on the glass surface may displace the dissolvable liner **410** but may be unable to dissolve same. However, the dissolvable liner **410** may pass through the openings **408** in the adhesive pattern **406** and contact the hydrophilic coating **404**. The hydrophilic coating **404** may therefore absorb the dissolvable liner **410**. The adhesive pattern **406**, which is now exposed, may be used to secure the label **400** to any substrate.

FIGS. **4**A-**4**D show illustrate an embodiment where the substrate to which the dissolvable liner label **400** is to be adhered is unable to absorb the dissolvable liner coating and/or water. The artisan will also appreciate from the disclosure herein that, in embodiments, the face ply of the dissolvable liner label may itself comprise film (instead of paper, for example) or other material(s) that are incapable of absorbing moisture.

Thus, as has been described, the dissolvable liner disclosed herein may serve to do away with traditional label liners, and in so doing, provide an environmentally friendlier

label. Moreover, the labels using the dissolvable liners disclosed herein may significantly reduce the manufacturing costs of the labels. Indeed, according to some preliminary estimates, the dissolvable liner may reduce the cost of traditional labels (i.e., labels having silicone laden liner plies) by up to 50%.

Many different arrangements of the various components depicted, as well as components not shown, are possible without departing from the spirit and scope of the present disclosure. Embodiments of the present disclosure have been described with the intent to be illustrative rather than restrictive. Alternative embodiments will become apparent to those skilled in the art that do not depart from its scope. A skilled artisan may develop alternative means of implementing the aforementioned improvements without departing from the scope of the present disclosure.

It will be understood that certain features and subcombinations are of utility and may be employed without reference to other features and subcombinations and are contemplated within the scope of the claims. Not all steps listed in the various figures need be carried out in the specific order described.

The disclosure claimed is:

1. A method of making a label and securing said label to a substrate, said label having a face stock comprising an upper side and a lower side, said method comprising:

formulating a dissolvable liner coating, said dissolvable liner coating comprising each of a remoistenable adhesive, activated coconut carbon filtered water, and gypsum;

situating an adhesive on said lower side;

covering said adhesive on said lower side with said dissolvable liner coating;

printing indicia on said upper side while said dissolvable liner coating is covering said adhesive;

causing said dissolvable liner coating to come into contact with water, said water dispelling said dissolvable liner coating to thereby expose said adhesive; and

securing said face stock lower side to said substrate via said exposed adhesive.

2. The method of claim **1**, wherein:

said label comprises a solitary ply;

said dispelled coating is dissolved in said substrate; and

said dissolvable liner coating is caused to come into contact with said water by using a sprayer to spray said water on a section of said substrate and situating said face stock lower side on said wetted section of the substrate.

3. The method of claim **1**, wherein said adhesive and said dissolvable liner coating is successively situated on said lower side in a border pattern.

4. The method of claim **3**, wherein said border pattern defines a central portion.

5. The method of claim **4**, further comprising printing indicia on said central portion at each of said upper side and said lower side.

6. The method of claim **1**, wherein said adhesive a hot-melt adhesive.

7. The method of claim **1**, wherein a topcoat is disposed on said upper side for said printing of indicia.

8. The method of claim **1**, further comprising situating on said lower side a hydrophilic coating.

9. The method of claim **8**, wherein said adhesive is applied on said lower side in a pattern, said pattern having a plurality of open areas configured to allow said dissolvable liner coating to be dissolved by said hydrophilic coating when said face stock is placed onto a moistened section of said substrate.

10. The method of claim **1**, wherein a weight of said gypsum in said dissolvable liner coating exceeds a weight of said activated coconut carbon filtered water.

11. The method of claim **1**, wherein said dissolvable liner coating includes a colored pigment.

12. The method of claim **1**, wherein said label is a shipping label.

13. A method of configuring a label for securement to a substrate, said label having a face stock comprising an upper side and a lower side, said method comprising:

formulating a dissolvable liner coating by mixing each of a remoistenable adhesive, activated coconut carbon filtered water, and gypsum;

situating a hot-melt adhesive on said lower side; and

covering said hot-melt adhesive on said lower side with said dissolvable liner coating;

wherein, said dissolvable liner coating is configured to be dispelled to expose said hot-melt adhesive when said dissolvable liner coating is brought into contact with water.

14. The method of claim **13**, wherein said mixing is effectuated using a cutting blade.

15. The method of claim **13**, further comprising printing indicia on said upper side.

16. The method of claim **15**, further comprising printing indicia on said lower side.

17. The method of claim **13**, wherein said water is tap water.

18. A method of configuring a label for securement to a substrate, said label having a face stock comprising an upper side and a lower side, said method comprising:

formulating a dissolvable liner coating, said dissolvable liner coating comprising remoistenable adhesive and gypsum;

situating an adhesive on said lower side; and

covering said adhesive on said lower side with said dissolvable liner coating;

wherein, said dissolvable liner coating is configured to be dispelled to expose said adhesive when said dissolvable liner coating is brought into contact with water.

19. The method of claim **18**, wherein said dissolvable liner coating consists of remoistenable adhesive, activated coconut carbon filtered water, and gypsum.

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